

Path Dependency and Adroit Innovation: The Case of California Water

By Helen Ingram and Leah Fraser¹

Introduction

Water problems are today so serious and so generally evident that the issue should claim a prominent place on the national agenda and command dramatic policy change. Severe droughts have disrupted water supplies in many parts of the country in recent years. Besides such extreme events, growing demands for water press close upon supplies over wide areas of the country and the long-term sufficiency of this critical resource is uncertain. Moreover, water pollution including heightened levels of organics, toxics, and salinity, from a whole variety of sources, is worsening. Protection of aquatic habitat for fish and wildlife is increasingly difficult. On top of these experienced difficulties, models of global climate change and some observable evidence suggest that water troubles will further deteriorate in coming decades as temperatures rise and patterns of rainfall and snow pack change. Climate change experts predict there is likely to be more extreme flooding in some places and at certain times of the year, while less water is available during the summer irrigation season.

Continuity rather than dramatic change characterizes water policy, although momentous shifts in policy direction do occur. Instead of the highly visible national discussion of the issue that characterizes punctuated equilibrium in such issues as women's rights, human rights and most environmental policies, significant change in water policy has tended to come at the sub-national level, with the federal government only one, and often not the most important, player. Further, administrative agencies, notoriously impervious to pressures for change according to theorists (Clarke and McCool 1996; Lindblom and Woodhouse 1980; Wilson 1995), are the locus of action rather than legislatures that are supposed to be more attuned to emerging issues.

This chapter deals with water policy changes related to the San Francisco Bay-Delta. This is the largest estuary on the West Coast, draining some 40% of the waters of the state of California including the watersheds of the Sacramento and the San Joaquin Rivers. Federal and state projects in the Delta deliver water to both cities and farms. Two-thirds of the state's residents, the majority of whom are in Southern California, receive some or all of their drinking water from the Delta, and it waters over 200 crops that produce 45% of the nation's fruits and vegetables annually. The Bay-Delta also supports the state's largest habitat for fish and wildlife, providing a nursery and migration corridor for two-thirds of the state's salmon and contains Suisun Marsh, the largest contiguous brackish water marsh in the United States.

According to most accounts, a veritable revolution in the Bay-Delta decision process has occurred in a cascade of decisions over the past decade (Nawi and Brandt 2002; Wright 2001; Rieke 1966). Instead of gridlock and crisis between water contractors and environmentalists marked by interrupted water supplies and the taking of federal listed endangered fish species, the situation is marked by peace. An important element of the newly found amity is the Environmental Water Account (EWA). Because fish agencies acquire water reserves through markets, they can time the release of such purchased water so as to avoid conditions that could trigger the Endangered Species Act (ESA). Therefore, the water contractors, cities and agricultural districts, are guaranteed no surprises that would interrupt the reliability of water supplies and no additional costs. Not only has the EWA contributed to the prevailing peace among previously warring groups, it also represents a sharp change in water policy in that it uses market-like mechanisms to provide water for fish protection. This has replaced the previous reliance on government regulations, making the transfer of water a far more amicable process than it had previously been.

This chapter relies heavily on insights from the punctuated equilibrium theory to explain the changes observed in California Bay-Delta water policy (Baumgartner and Jones 1993; Baumgartner, this volume; Gersick 1991). Because water policy is largely dominated by stability, ideas from path-dependency literature are also useful (Pierson 2000). Since much of the action takes place within administrative agencies and their environs, new institutionalisms' concepts developed within sociological organization theory are exceptionally helpful in identifying the cultural conditions for the emergence of new organizational forms (DiMaggio and Powell 1991; Rao, Morril and Zald 2000). We begin with the longstanding characteristics of water policy that make it so impermeable to abrupt policy change, contributing to path dependency in water policy. The narrative emphasizes the self-reinforcing mechanisms of policy image, institutions, and professionalization, as well as risk-spreading strategies that

blunt attempts toward fundamental change. At length, however, these approaches to policy prove insufficient, allowing dissatisfied environmental participants to bring Bay-Delta Water Policy to a standstill.

The chapter then turns to the emergence of some conditions identified in the literature as necessary for punctuated equilibrium policy change. Beginning with the evidence of policy failure, conditions range from issues of reframing and social mobilization to shifting venues. The chapter sketches the outlines of some of the most important policy changes brought about in a series of actions leading up to the institutionalization of the CALFED Bay-Delta Authority in 2002. Arguably the most innovative policy change embraced in the process, at first only as an experiment, was the market-like water transfer mechanism, the Environmental Water Account. A detailed examination of how this new policy tool emerged as a viable idea and how it has been implemented suggests that what is in fact a sharp departure from past policy has been accepted seemingly as a permanent policy fixture, without much of the controversy that has surrounded rural to urban water sales in California. The chapter ends with some observations about sub-national policy change and reflections on the possibility of adopting astute and adroit policy changes even in path dependent policy domains dominated by notoriously sluggish government agencies.

Path Dependency and Water Resources

Political scientists who have adapted the economic concept of path dependence to political phenomena emphasize the self-reinforcing characteristics or increasing returns aspects of successive policy steps. Once a policy domain begins to follow a particular track, the cost of reversal becomes very high. That is, the choice of other options- including some previously rejected alternatives- becomes less likely over time (Pierson 2000, 252). The application of these ideas to the large infrastructure-building approach long dominant in water resources policy is painfully obvious. A range of engineering technologies involving dams, diversions, locks, ditches, and channelizations were adopted throughout the first half of the early 20th century to tame and put to productive use such large rivers as the Mississippi, Missouri, and the Colorado. Each big construction project involved large set-up and fixed costs. Besides the enormous financial outlay involved in the initial construction, maintenance costs of water works are quite high because of the notoriously erosive powers of flowing water. The long time period involved in the authorization, funding, and construction of projects, currently averaging 27 years, represents a sunk political cost as well. Politicians and agencies that might have been elsewhere occupied have their records tied into the perceived success of big water projects. Furthermore, water infrastructure projects are usually financed by loans to be repaid by user fees over a period of 30 or 40 years. There is enormous reluctance to abandon a structure not yet paid off.

Once a project appears inadequate or flawed, it is more attractive to modify or add on to the project rather than to start anew. After an aqueduct is built, it is like a thirst that must be quenched continuously. Water users have made investments to connect to the aqueduct and depend upon it for vital supplies. There is an incentive to search further and further away from the immediate watershed to find new water sources to keep the aqueduct full rather than to manage demands for water so that moving water over long distances is no longer necessary. Environmental effects of infrastructure projects almost never lead to the early termination of projects. Instead, adverse consequences to fish are usually mitigated by additional construction of add-ons, like fish ladders, fish hatcheries, or tank truck portage of fish around dams. People forced to move away from bottomlands to be drowned out by planned reservoirs are compensated with resettlement aid and perhaps a promise of future water projects that would benefit them.

Policy Image

Something beyond the high exit costs from the policy trajectory underlies the continuity found in water policy. Crucial to the self-reinforcing mechanisms at work in water policy is the persistence of what is variously called the underlying master frame (Benford and Snow 2000; Gersick 1991; Snow and Benford 1992), policy image (Baumgartner and Jones 1993), or dominant causal logic (Schneider and Ingram 1997). Underlying all public water issues is a social construction of problems' causes and likely solutions. Therefore, in the water policy arena, there are a host of possible problems for which policymakers draw from a limited set of policy responses to solve. For most of the 20th century, water was considered to be a product that is delivered through engineering systems that were managed to serve human values including municipal and industrial uses, agriculture, industry, and outdoor recreation (Blatter and Ingram 2001). Natural watersheds and river systems were denatured in the sense that they

had to be modified to fulfill human desires. Variations in nature such as spring floods and summer droughts had to be controlled by dams that held back flows that were too large and stored excess water in reservoirs that could be drawn down later when natural flows were too low. The task of water policy was to routinize the irregular.ⁱⁱ When supplies became unreliable, of undesirable quality, or overly expensive, an engineering solution was sought.

The notion of water as product was not just an escape from the irregularities of nature; it was also an uncoupling of water from places with distinctive climates, cultures, and geography. The All American Canal brings vast quantities of water from the Colorado River across the desert to serve Southern California farms and cities. When it became clear in the early 1960's that upper basin states would not allow California unlimited access to the Colorado River, the State Water Project was constructed. The State Water Project tapped into the same Bay-Delta estuary that had previously been profoundly altered by the U. S. Bureau of Reclamation's Central Valley Project (CVP). The CVP is a system of dams, dikes and ditches that encompasses an area 400 miles long and 100 miles wide, serving mainly to irrigate lands that were once ecologically rich wetlands. The State Water Project moves water through massive pumps from the Bay-Delta and conveys it 662 miles south. Thus, the waters nature intended to flow to the sea from the Sacramento and San Joaquin Rivers have been relocated. Through the wonders of water engineering cities like Los Angeles and San Diego can bloom in landscapes that naturally could serve only very small populations.

Institutionalization

The political institutions, particularly government agencies and their closely linked constituencies, in conjunction with water infrastructure projects, promote path dependency. There is a vast literature in water resource politics that chronicles how dominant interests in a particular historical context manage to perpetuate their dominance through institutionalization (Clarke and McCool 1996; Ingram 1990; Maas 1951; Reisner 1993; Worster 1985;). The beneficiaries of projects prosper, grow in numbers and economic strength and identify positively with the agencies and policies that constructed the projects and delivered the largess. Government agencies come to depend upon the vocal support of their constituents, the water users, in budgetary and legislative decisions.

Early and sometimes arbitrary success can shape subsequent actions (Powell 1991). For example, the success of Los Angeles in aggressively laying claim to and exploiting distant sources of water even before there was sufficient population to use it set a trend and trajectory for many other states and localities. The cleverness and foresight of William Mulhullond, an early water official, was largely responsible. Mulhullond rose to the top of city water administration mostly by accident when the city took over a failing private water company, and Mulhullond transferred to public employment because he was the only person who knew where all the lines of Los Angeles's far-flung water supply system ran. Early on, the city laid claim to the total supply of the Los Angeles River. The city, under Mulhullond's direction, declared war on upstream users and won a series of court victories. Mulhullond was the mastermind of the rather underhanded scheme to bring water through a mammoth aqueduct from the Owens Valley to Los Angeles to serve a population boom he and other city administrators hoped would come. The city quietly expropriated water rights and resident farmers were caught unaware (Lach et al 2002; Lach et al Forthcoming 2004). With Mulhullond's encouragement, agency expansion accompanied the acquisition of water. Los Angeles Water and Power combined with a number of other governmental entities in Southern California to form the Metropolitan Water District (MWD). The MWD was a major player in securing the State Water Project and to this day is a major force in California water politics. Los Angeles's early success at producing water through infrastructure projects that moved water from far distant places became the model for other Western cities and through its early victories Los Angeles was assured of a continuing reliable, cheap water supply.

Professionalization

Path dependency in water policy was further legitimized by the emergence of a cadre of water professionals with a recruitment and reward structure that supported the prevailing ideas of water as the product of an engineered system. Hydrology and water resources experts are a global fraternity that arguably had its beginnings in the American West. While a diversity of academic disciplines are involved, it is generally accepted that water can and should be rationally managed. This brings experts from the physical sciences and economics to dominate the water policy arena. A number of universities, especially in the West, grant advanced degrees in water resources management. These graduates find

their professional niche in governmental agencies and complementary organizational forms. In particular, engineering consultant firms including Dames and Moore, CH2M Hill and others employ a large number of these graduates. Organizations like the American Water Resources Association and the American Geophysical Union publish important water journals, the contents of which shape organizational standards and routines. Water resource planning is highly rationalistic, involving large numbers of experts who simulate the vagaries of nature with highly sophisticated stochastic models. Water professionals nonetheless diagnose problems and prescribe solutions along path-dependent lines that are prone to exaggerate the benefits of projects and to underestimate adverse environmental consequences that are usually portrayed as “manageable”.

Benefit and Risk Spreading

Beginning almost half a century ago, the concept of water as product, combined with the institutional arrangements that supported and perpetuated this conceptualization, came under heavy attack. To survive, policy strategies were developed to accommodate challengers without making fundamental policy change. One strategy was to generalize the beneficiaries. Supporters of prevailing policy were able to argue very effectively that the welfare of some was connected to the welfare of all. Linked infrastructure led to a coordination of effects. As a consequence of the huge service area of the MWD, the cities growing up around Los Angeles became junior beneficiaries in relation to Los Angeles Water and Power. As a result of the State Water Project, the level of snow pack in the Sierras became important to water availability and quality all over the state.

Preservationists mobilized early on to voice opposition to water infrastructure's damaging effects on the natural environment. The water resources community responded to these allegations by including more and more beneficiaries in their multi-purpose projects, thereby increasing the political power and numbers of water development projects. In addition to farmers and urban water users, hydropower benefits and recreational facilities were added on to projects. To satisfy rod and gun clubs, fish hatcheries and wildlife sanctuaries were cobbled onto water legislation. Institutional arrangements were fashioned so that a risk to one was a risk to all. Fish and wildlife agencies got a large proportion of their budgets from water construction agencies that had to document project effects on fish and wildlife. As a consequence, many adverse effects were mitigated and few projects were halted outright. The overall consequences of these benefit and risk spreading strategies was the overbuilding of very expensive water facilities that were inefficient, complex, and prone to large unanticipated negative effects.

Non-Negotiable Claims and Deadlock

For water interests concerned with the San Francisco Bay-Delta, the policy path came to an abrupt end in 1982. The voters decisively defeated the peripheral canal, designed to move water around rather than directly through the Bay-Delta. Residents in Northern California opposed the loss of what they considered their water to the South. Environmentalists were not satisfied with the small number of environmentally friendly add-ons to the legislation. At the same time, farmers with agricultural interests in the San Joaquin Valley believed the deal included too many environmental restrictions. Further, the policy package designed to add numerous beneficiaries (who in the end did not support the legislation) became so expensive that voters suffered from sticker shock (Nawi and Brandt 2002).

Not only was water development brought to a standstill, the long dominant interests lost some of their previous gains through court setbacks and other events. First the courts in 1986 and then the Environmental Protection Agency in 1990 disapproved of the state's water quality standards in the Delta. They ruled that the standards did not meet the requirements of the Clean Water Act. Cuts were made in the water entitlements of farmers in the Central Valley. The Central Valley Improvement Act allocated 800,000 acre feet a year of the projects supplies to fish and wildlife restoration. Even more ominous to the dominant interests, the Sacramento River Winter-Run Salmon and the Delta Smelt were listed as endangered. Because the pumps for both the State Water Project and the Central Valley Project damage fisheries and fisheries agencies are empowered by the Endangered Species Act to shut down the pumps if the “take” of endangered fish becomes too large, the reliability of water supply to cities and agricultural contractors was threatened. The lawsuits brought by environmental groups to implement the Clean Water and the Endangered Species Acts increased the uncertainty surrounding water resources.

Emergence of Some Conditions for Punctuated Equilibrium

Policy change theory anticipates the kinds of difficulties encountered in the Bay-Delta in the early 1990's. Institutions' resilience and self-reinforcing qualities can ward off change for long periods of time, but not indefinitely. Significant institutional and policy change does occur periodically. While theorists differ about the extent to which incremental (Hogwood and Peters 1983; Sabatier and Jenkins-Smith 1993; Kaufman 1976; Kingdon 1995) and continuous change occurs even during path-dependent periods, most theorists agree on the episodic pattern of larger innovative change (DiMaggio and Powell 1991; Baumgartner and Jones 1993, 2002). Punctuated equilibrium takes place when accumulated forces for change overwhelm path-dependent institutions, with the result that institutions and policies are displaced and superseded.

Evidence of Policy Failure

The water resources community prizes low visibility. Researchers have described water utilities as very conservative institutions that measure whether or not they are doing a good job by their ability to stay below the radar of the press and politicians. They deliver a product which people expect to be reliable, high quality and low cost. When water becomes a public issue, gaining notoriety by itself, it is taken by these conservative organizations as a sign of failure (Lach et al Forthcoming 2004; Rayner et al 2002). The actions by fisheries agencies, environmental agencies, and court suits by environmentalists involved the water community in a series of alarming headlines.

Matters reached a head in what was widely referred to as the "smeltdown". In June, 1999, a story in the Sacramento Bee under the headline "Protection of Fish Puts Farm, Bay Area Water at Risk" quoted a high ranking local water official as saying "what has emerged in the last 48 to 72 hours is a real water supply crisis." (Stanford Law School) Numbers of endangered smelt had lingered around the pumping plants for weeks beyond what was expected, forcing operators to pump less than half the normal amount. Besides the fact that they were listed as endangered, little was known about the three-inch translucent fish that die when handled and are drawn through the protective fish screens of the big Delta pumps to be ground to death. Even environmental groups shunned such publicity because such an uncharismatic species had little hope of winning public sympathy in a water war between fish and people.

Yet, the issues raised were more fundamental than the headline suggested. Environmental and Fish agencies have missions that fundamentally conflict with the water community, making it impossible to accommodate everyone using the benefit-spreading strategies described above (Rayner et al 2002). Further, the underlying developmental values supporting the conception of water as a product of engineering processes were being drawn into question by these events. The citizens of California support environmental and lifestyle values and expect those values to be reflected in the state's treatment of water. Instead of decision-making processes that integrated environmental concerns, warring agencies were making directly conflicting decisions and policy statements. High levels of suspicion marked the relationships between water agencies and environmental groups. The decades during which the water community had slighted the environmental consequences of policy, while at the same time claiming a monopoly of relevant expertise, had taught environmental activists to be deeply distrustful of water officials.

Reframing Problems

Despite its suggestive role, evidence of failure is usually insufficient to cause policy change. There must also be a new policy image, symbolic appeal, frame, or causal story to connect both the emergence of problems with institutional and policy failure and to link issues to possible alternative solutions (Snow and Benford 1992; Hojnacki and Baumgartner 2003; Rao 1998; Baumgartner and Jones 1993). Theorists sometimes use the singular in referring to the emergence of a new policy image (Baumgartner and Jones 1993). In an administrative setting, however, multiple logics often exist, providing different legitimating narratives for action (Morrell 1993). Such alternative concepts of water gained currency among the public and policy elites and supported sharp changes in policy direction.

Water as an element embedded in the ecology of specific places is an attractive conception to many environmentalists and life scientists (Blatter, Ingram and Levesque 2001). Water in this perspective is viewed as inseparable from other environmental elements that make up a particular watershed or bioregion. The characteristics of water, including quantities, chemical composition, temperature and turbidity are suited to the habitats in which it is found. Fish biologists note that at least part of the mechanism that returns salmon to spawn in the streams of their hatching has to do with the minerals

flowing up through the gravel at specific stream sites. Small variations in stream temperatures that can be easily caused by impoundments and return flows from irrigation can make a stream an unsuitable fish habitat.

Viewing water as a place-specific environmental element helps explain the unintended negative effects of some dams. To support the food chain, riparian areas depend upon organic materials picked up in spring floods. Less turbid water released from dams deprive streamside plants of the silts essential for their flourishing. The irregular surges of water released from dams for hydroelectric power alternately wash out or strand the fish eggs laid in shoreline gravel and leave small fingerlings high and dry. According to the lessons taught by taking this perspective in contemporary water management, most water projects need to be re-engineered to reflect natural forces more closely. Ecosystems management requires that many environmental parameters must be varied in a flexible fashion to respond to species needs. Standard government regulation is too clumsy and inflexible a tool to serve the fine tuning that ecosystems require.

From a very different perspective, water can also be viewed as a commodity. This frame accepts the idea that water is a product that is portable from one place to another but asserts that the cost of water should reflect its productive value. Natural resource economists, particularly those associated with public choice theory, tend to see water problems not as questions of scarcity but of misallocation. Water problems would evaporate if it were simply allowed to flow to the highest valued uses. Since water is worth a great deal more in urban households and industry than in farming, transferring water from farms to cities could solve California's water problems. From this point of view, many of the past water infrastructure projects found so objectionable by environmentalists and ecologists are also objectionable on economic grounds. Many projects are simply an unwarranted subsidy to agriculture. Further, even growing urban water demands would be lessened and water conservation would be promoted if water were priced at its full economic value (Anderson and Leal 1991).

While these two partially conflicting perspectives capture much of the critical discourse about California water policy in relation to the California Bay-Delta, there are important political concerns that they both ignore. Both perspectives are highly rational and tend to view water instrumentally. The first perspective, water as a place-based ecological element, assumes that ecological processes can be understood and predicted and that ecological damage can perhaps be restored. The second perspective allows that there may be certain aspects of water that can not be quantified or monetized but asserts that even most environment values have a price which many environmentalists (if given the correct institutional mechanisms) would be willing to pay to preserve. Neither perspective is especially sensitive to the cultural values towards water often held by more traditionally oriented minority groups (Brown and Ingram 1987). Nor do they capture the socially constructed lifestyle values many contemporary environmentalists hold about water. For some, water is not instrumental but rather an end in itself, bound to notions of health and purity. Nonetheless, conceptualizing water either as a place-based environmental resource or as an economic commodity now represents the most dominant among the emerging frames in contemporary California water discourse.

Administrative Entrepreneurship and New Management Practices

At the same time that frameworks for understanding water problems were undergoing change, ideas about ecological management systems were also in flux. The "smeltdown" was only one of a large number of similar clashes in which the Endangered Species Act directly threatened public comfort and economic well-being. As was often the case for endangered species, the science upon which administrative decisions were being made about the smelt was quite weak. Further, the application of the ESA was a draconian administrative action taken without public consultation and participation. Then Secretary of Interior, Bruce Babbitt, was determined to take proactive steps to avoid the Endangered Species Act being repealed or modified by Congress during his watch (Doremus 1997). The Babbitt administration endorsed a new approach to wildlife species and watershed management labeled adaptive or ecosystems management.

Adaptive or ecosystems management is a vague concept best defined by Kai Lee (1993) in describing the Columbia River Basin. The practice is an explicit directive to incorporate new and evolving science into natural resources decision-making. It recognizes that under many circumstances decisions must be made and actions must be taken without precise knowledge about what may then occur. In such cases, policy formation is a matter of "learning by doing" in which experiments, replication, controls, and extensive monitoring are encouraged. Adaptive management envisions a very close relationship

between scientists and managers, with management needs taken into account in setting agendas for scientific research and with managers closely tuned in to the latest scientific advances and also willing to modify practices in order engage in controlled experiments.

This management strategy also recognizes that local habitats and watersheds can be enormously complex and that local residents often have invaluable knowledge and perspective. Adaptive management envisions incorporating locally-based understandings along with more conventional science. Continuous collaboration between scientists, managers and the public is promoted. The management strategy offered Secretary Babbitt flexibility and thus the potential to avoid damaging conflict. If managers and warring groups could come together under the legitimizing mantle of science to find ways to restore habitat and improve ecological conditions before endangered species were listed, then crises could be averted (Babbitt 1994). The Department of Interior followed this strategy in a number of settings, including the Habitat Restorations Program, the Everglades and in the San Francisco Bay-Delta. The ecosystems approach fit nicely the circumstances of endangered fish in the California Bay-Delta. Biologists recognized that regulations were not delivering the benefits to ensure fish survival. Regulations could not deliver water where, when, in the desired quantity and quality needed to serve ecological requirements. Water needed to be available at particular times and places and at particular temperatures. Such flexibility required adaptive water management attuned to fish biology and changes in immediate climatic conditions.

Venue Shifting

Policy change theorists see the emergence of a new venue as critical to the innovation process. A new venue can take the form of a government institution that is created, altered, or newly involved and endogenous to the policy process (Baumgartner and Jones 2002). The sorts of new venues theorists identify are often court interventions, switching jurisdictions of Congressional committees or the involvement of a different executive department or agency (Baumgartner and Jones 1993). In the San Francisco Bay-Delta, the policy-making landscape was cluttered with administrative agencies at all levels of government and few of them were acting in concert. Further, agencies were being buffeted by conflicting constituencies of farmers and urban water utilities along with disaffected environmental groups that were critical of all the agencies. The arena here was administrative and most of the action took place between agencies and interest groups. The insights of organizational theorists are helpful in understanding this kind of agency-centered policy innovation. New organizational forms can emerge in the gaps or interstices among overlapping jurisdictions and multiple organizations when the long dominant frames of reference no longer seem to work. Interstitial emergence begins, according to theory, with pragmatic innovation among a network of players responding to their shared perceptions that conventional solutions have little promise for them (Morrill 1993).

Former Assistant Secretary for Water and Science in the Babbitt Administration, Elizabeth Anne Rieke, testifies to interstitial emergence in the case at issue here. She writes that the federal strategy for brokering a solution was, "designed to create an overlay of procedures and processes to compensate for the perceived inadequacies of the statutory mechanisms for agency cooperation, federal-state collaboration, and stakeholder participation in decision-making (Rieke 1966)." The conditions for such emergence were set by clear indications of policy failure. Rieke writes, "In the Spring of 1993, when I was first drawn into the Bay-Delta conflict, California agricultural, urban, and environmental interests had been fighting for more than a decade over the level of water quality standards needed to protect the fish and wildlife resources of the Bay-Delta (Rieke 1966)."

Pressure to break the long-standing deadlock over water management in the Bay-Delta was intensified on the Department of Interior when Republican Governor Pete Wilson ordered his state water quality board to withdraw its most recent effort to set a water quality standard. He stated that the ESA "permits the federal government to preempt the state in its allocation of water resources" and piece-meal, uncoordinated implementation of the ESA made it impossible to predict the total impact on water supplies, thereby creating enormous uncertainty for water users (Rieke 1966, 6). Secretary Babbitt responded that the governor had chosen to abdicate his responsibility and that the federal government would be forced to step in. To defuse some of the conflict and with the blessing of Secretary Babbitt, Assistant Secretary Rieke took the initiative to coordinate the activities of federal agencies including the National Marine Fisheries Service, the Environmental Protection Agency, the Fish and Wildlife Service and the Bureau of Reclamation. Formally known as the Federal Ecosystem Directorate and more popularly as "Club-Fed", the group negotiated and published in the federal register a single notice in

December, 1993 on an integrated set of federal regulatory proposals to protect the Bay (Nawi and Brandt 2002, 12). The following June, the Governor's Water Policy Council agreed to join with Club Fed to coordinate activities in the Delta, particularly in setting water quality standards.

There followed a series of semi-informal meetings that included not only federal and state agency people but also representatives of water contractors, farmers, and environmentalists. The science behind the water quality standards was of particular concern, so the group engaged a peer review process designed to overcome suspicions that federal science was driven by predetermined policy decisions. In December 1994, federal and state officials agreed to a number of actions that defused controversy and pledged that cooperation would replace conflict. The Bay-Delta Accord established new entities: CALFED, a group of California and federal officials charged with continuing the collaborative effort. In May 1995, the CALFED Bay-Delta Program was charged with forging a long-term, comprehensive agreement. The federal government agreed to purchase any additional water beyond that provided in a month-by-month calculation of limitations on exports needed for ESA protections spelled out in the agreements. In exchange, water user groups agreed to assure monetary contributions toward non-flow measures for fish protection.

Social Mobilization

According to policy theory, the mobilization of a challenging social movement motivated by new policy images and demanding change is a critical factor in policy innovation (Baumgartner and Leech 1998; Berry 1984, 1999; Gamson 1975; McAdam 1982; Meyer and Tarrow 1998; Tarrow 1998; Tilly 1978). Such mobilization is often accompanied by the rise of new interest groups attracting previously uninterested adherents and new coalitions among existing groups (Meyer, Jenness and Ingram Forthcoming). Interest group realignment, rather than very substantial outside mobilization, seems to be a critical ingredient in the Bay-Delta policy shift. While the public was alarmed about news stories of water crisis that threatened 20 million urban residents, the Byzantine architecture of water and endangered species policies eluded any simple and mobilizing portrayal. The specter, rather than the reality, of an aroused public insisting on reliable water supply probably was a threat that kept all the parties at the table.

At the same time, particular policy entrepreneurs (Mintrom 2000) took steps to create public pressures for solutions. An array of well organized interest groups were parties to water wars over the California Bay-Delta, and many of the same groups and individuals that fought the battle of the Peripheral Canal in the early 1980's were still at it nearly 20 years later. Three major collections of groups exist: agriculture, urban water utilities, and environmentalists. Overlaying these divisions are the longstanding geographical separation of Northern and Southern California, with Northerners fear of the loss of water and political clout to the fast growing urban areas in the South. Strengthening ties across geographical divisions between urban and agricultural interests along with what some view as enlightened attitudes on the part of the environmentalists made agreement possible. Through much of the time groups were at loggerheads but the principles of adaptive management, as well as political necessity, led agency officials to continue with broadly representative stakeholder meetings. Beginning in 1996, stakeholders met formally as a federally chartered Bay-Delta Advisory Council, but throughout the process groups met together in countless working groups and small meetings.

If California were a country, it would be the sixth leading agricultural exporter in the world. The agricultural industry sells an average of \$20.8 million in farm exports daily to destinations far and wide (Nawi and Brandt 2002). Almost all of the agricultural production depends upon irrigation. Therefore, agricultural interests have significant political clout and economic might in the state. These interests also hold very senior and very valuable water rights. The Central Valley draws water from state and federal water projects and San Joaquin farmers as well as other farmers south of the Delta depend on water that flows through the Delta. The continuing viability of agricultural water users of Bay-Delta water is dependent not just on water availability but also on water quality. Maintenance of the levees to prevent inundation of Delta farmlands, many of which are below sea level, is also an important water-related interest of farmers. A prolonged drought began in 1987 and this loss of water was worsened by what many farmers viewed as a "regulatory" drought stemming from cutbacks made necessary to meet standards of the Clean Water Act and the Endangered Species Act.

Urban water utilities, including the Metropolitan Water District, are the second significant group of interests. Among utilities the MWD was a goliath, with a staff and resources nearly matching the entire budget of the Bureau of Reclamation. A good portion of Silicon Valley receives water either directly or

indirectly from the Delta and at the time the City of San Francisco also become involved. In 1993-1994 urban interests took the lead in what was called the Three Way Water Agreement Process, which included the environmentalists as well as farmers and which evolved a kind of consensus on water quality. Over time, this developed into a north-south alliance that included agriculturalists as well as urban interests but marginalized environmental groups. The urban/agriculture alliance was facilitated, perhaps, by emerging water markets. Gridlock in the Delta was a threat to voluntary water transfers from agriculture to urban use. As long as adverse impacts on fish populations led to restrictions on diversions, transfers of Delta water would be limited. However, all three groups did develop relatively constructive relationships with one another during the three way consultations. Further, the seeds of new ideas such as the Environmental Water Account were sown in the Three Way Water Agreement Process (Rieke 1966; Fullerton 2003).

Environmental groups constituted the third group of interests. These included national groups like the Natural Heritage Institute, Environmental Defense Fund and the Natural Resource Defense Council, among many others, as well as a number of groups focused primarily on the Bay-Delta, such as The Bay Institute of San Francisco and Save San Francisco Bay. The resources of these groups were dwarfed by a combination of both urban and agricultural interests. Their leverage was further eroded by internal disagreements. The survival of endangered fish was not always the first priority. For some groups halting the expansion of urban areas and urban water use was more important than the welfare of fish, and the ESA was only a means to slow development. For others, the human health of urban residents was a critical environmental issue, and water quality was of the utmost importance. Such divisions hampered the construction of coalitions through which influence could be pooled. Even without coming together, however, environmentalists had the advantage of the leverage of citizens' suits and federal laws. Authoritative commentators on the emergence of agreement noted that a strong incentive for other parties to come to agreement was created by lawsuits filed by environmental plaintiffs to enforce the Clean Water Act and the Endangered Species Act (Nawi and Brandt 2002). At the same time, environmental groups had much more influence in holding up the process rather than in shaping policy as agreements between urban and agricultural interests emerged.

The mobilization of interests outside the groups discussed above that did take place was designed to force agreement and to avoid gridlock. Assistant Secretary Reike traveled around the state urging business interests to hold the feet of both federal and state officials to the fire. Urban water utilities, especially the MWD, also mobilized business interests. A letter to President Clinton and Governor Wilson signed by heads of BankAmerica Corporation, Wells Fargo Bank, the Federal Reserve Bank and San Francisco TransAmerica Corporation, Southern California Edison, Pacific Gas and Electric and San Diego Gas and Electric and others stated that continued gridlock was simply unacceptable (Rieke 1966).

Decision Cascades and Momentum

Policy theorists point to the importance of the context in which decisions are made. Sometimes the innovations that might be impossible to accomplish if considered separately are swept along as other critical decisions fall into place (Baumgartner and Jones 2002; Hojnacki and Baumgartner 2003). Cascading has been examined in the policymaking literature recently as a component of positive feedback processes (Baumgartner and Jones 2002; Hojnacki and Baumgartner 2003; MacLeod 2002). The momentum gains power over time. Originating within the economics literature under terms such as "lock-in" and positive returns, the concept of positive feedback served as the backdrop to threshold models and was applied to voting behavior theories in economics and political science (Baumgartner and Jones 2002, 15-20). The idea of cascades helps us to understand the process whereby dramatic policy change occurs after long periods of stability. This sharp change can be the result of a small institutional change that leads to changes in implementation, policy image or myriad other changes that follow once an initial, often random, event starts the ball rolling. In the case of California water policy, the initial shift that began the cascade was a critical Bay-Delta water agreement that created momentum that ultimately transformed the way that California water is viewed and managed.

Each agreement struck on the management of Bay-Delta water built positive momentum for subsequent agreements. The resolution of each tough decision carried over to other policy decisions. The Bay-Delta Accord struck in 1994 led to a phased Calfed Bay-Delta Program. Phase II, the preparation of a comprehensive programmatic environmental impact review, reached a sticking point as Governor Wilson's term ended. Secretary Babbitt and Governor Wilson's Chief of Staff George Dunn staged a series of marathon meetings with stakeholders related to CALFED issues in the Fall of 1998, but

no agreement was reached on a preferred alternative for CALFED, although added support for the key idea of an Environmental Water Account emerged from those meetings (Nawi and Brandt 2002). The environmental group participants in the meetings endorsed the idea, intending it to be only a temporary buffer to protect endangered species while long term arrangements were worked out between resource agencies and project operators (Bay Institute of San Francisco 2001). Governor Davis's Administration proceeded cautiously and although the CALFED staff held a number of stakeholder meetings, dispute broke out about the management and accounting of Central Valley Project water dedicated to the environment.

Secretary Babbitt had too great a stake in the process to allow it to languish. In the Fall of 1999, a series of closed meetings took place between senior administrators at the Department of the Interior, Secretary Babbitt (at times), his representative David Hayes, members of the Governor's cabinet, and Susan Kennedy, the Governor's Cabinet Secretary. These high level negotiations focused on a few key issues including timetables, funding, and the Environmental Water Account. Based on these meetings, Secretary Babbitt and Governor Davis released a framework for action on June 9, 2000. In the next ten weeks, both the federal and state governments worked collaboratively on a final Environmental Impact Statement/California Environmental Impact Report and a federally required Record of Decision (ROD). The issuance of the ROD was the next successfully negotiated challenge. The preparation of the ROD included gaming exercises related to establishing the size of the EWA, an issue we will return to later.

The positive momentum has survived the transition to the Bush Administration; an administration that is far less interested in California water and has not yet authorized federal participation (although it continues to do so informally). On January 1, 2003, the State of California authorized the California Bay-Delta Authority that is to include 6 state and 6 federal members (unauthorized), 5 members from regions affected by the Delta, two at large members appointed by the state legislative leaders, and 4 ex-officio members also appointed by legislative leaders.

Momentum in cascades of decisions operates across issues in packages as well as over time. This latitudinal momentum is important in explaining how the elements of the agreement could be stapled together. The final high level negotiations included only a few key issues: setting out well defined milestones for measuring progress in implementation; selecting storage options to pursue with site specific environmental analysis; committing to program funding; and the Environmental Water Account. By the time negotiators got to the EWA, many difficult hurdles had been overcome and the EWA was not the kind of deal breaker that opponents could rally around. While it certainly had skeptics in the environmental and farming communities, neither group was sufficiently negative to carry the day against strong urban and business support. There were those in the fisheries agencies that were wary of staking the implementation of the Endangered Species Act upon the willingness of politicians to appropriate money for the Environmental Water Account. However, at this point the overall settlement had such a high public profile that no agency officials wanted the blame for the package falling apart laid upon them or their agency (Snow 2003). Consequently, the very innovative idea of fisheries agencies using water markets to avoid damage to endangered species was adopted.

Innovative Policy and Astute Policy Design

The line between incremental and innovative policy is not easy to draw, especially in complex, multi-faceted policies. There is a complex combination of positive and negative feedbacks at play within complex institutions (Baumgartner and Jones 2002). Certainly not all of the policy process and content adopted in the California Bay Delta Authority is innovative. The pattern of benefit and risk sharing that marked path-dependent water decisions is still very much evident in the packaging of these agreements. The package includes a huge new commitment to habitat restoration, grants to watershed groups, aid to cities for water quality and water conservation programs, levee maintenance for farmers, as well as more traditional infrastructure items such as storage, water supply, pumping and other improvements. There is practically no evidence of user fees, and government money, much of it gained through the passage of bond issues, supports this highly distributive program. At the same time, the California Bay Delta Authority is a new entity. It has embraced and is currently attempting an adaptive management approach to water management. This new organization has legitimacy and greater public trust than the older water agencies with long records of disregarding environmental impacts. It is strongly committed to well-financed scientific research and intends to monitor actions and document lessons. The heavy emphasis on environmental restoration is a policy innovation but it could be argued that the program is a pay-off to environmentalists given in exchange for new infrastructure and their agreement to allow exports from the

Delta to grow. There continues to be a developmental tilt to the program, and the emphasis is upon making existing water serve larger goals than cutting back on water use (Public Citizen 2004). The process of decision-making has become much more peaceful and collaborative, but most participants agree that peace is not a sufficient measure of adequate change (EWA Science Review Board 2003).

The Environmental Water Account, which doubtless would not have been adopted except for its place in the complex, larger package, provides convincing testimony that meaningful change has occurred. As policy theorists have observed, great change may emerge from actions that at the time appear unremarkable. While not entirely clear at the time, the EWA signaled a backing away from the regulatory approach that had marked fish protection. Instead of simply mandating water releases and letting water contractors whose expectations of water supplies were disappointed bear the cost, fisheries agencies themselves were to own and manage water. The EWA involves voluntary water sales and contracts. It guarantees that environmental water will be available for fish without any uncompensated cost to the contracting agencies (cities and farms). It also modifies the role of fish agencies that were to manage the account, and requires a close working relationship with facilities operators not previously sympathetic to fisheries problems.

An integral aspect of EWA's innovative design is its dependence on water acquisition through voluntary markets rather than by governmental mandate. Water markets encounter considerable resistance even though most water resources academics and many environmental groups favor moving water to higher value uses through markets. There are concerns about the ancillary effects of water sales on agricultural communities. Further, markets make the allocation of water more efficient but do little to halt urban growth and development that many environmentalists oppose. Consequently, many water sales are quite controversial even though they regularly occur and have been taking place for over thirty years. The sale of water from the Imperial Valley to the City of San Diego that transfers 200,000 acre feet took nearly a decade and enormous political capital to accomplish. That transfer continues to have bitter enemies among some farmers and the Republic of Mexico who will inevitably suffer negative indirect effects. In contrast, the Environmental Water Account, which in some years has moved almost as many acre-feet, and was negotiated in months and has a generally favorable public image.

Gestation Period and Networked Support

In water policy as in many other areas, some ideas have a long shelf life. There are many water projects that remain as plans within construction agencies until some event or crisis produces the perceived problem for which the project is dusted off and presented as the solution. The idea of protecting the environment through markets is an old concept espoused by the Interior Department during the Reagan Administration and favored by many California environmentalists. To some, however, the idea seemed wrongheaded. According to the public trust doctrine, the state was supposed to guarantee the use of water in the public interest of citizens and if low flows were endangering fish, then diversions from the streams should be regulated. The citizens should not have to pay to purchase the welfare (adequate flows for fish) already guaranteed. Agricultural interests also had doubts. If problems were solved through markets, there would be less public support for the infrastructure projects farmers believed were essential. Further, many farmers felt that water sales might make individual farmers better off, the farming communities would suffer as people moved off the land and no longer supported local businesses, schools, and civic enterprises. Further, water sales to city or state government raises both the demand and water prices, making water more expensive in local water markets among farmers. As a consequence, water markets have been talked about far more than they have been actively pursued until recently.

There is no consensus among authorities regarding the genesis of the Environmental Water Account. During the drought lasting from 1987 until the early 1990's, fifteen million dollars were allocated to help fish and wildlife. The money was used in a variety of ways, but at least part of it was used for the California Department of Fish and Game to buy water that could be used to improve habitat and flows for fish (White interview 2003). While not a continuous fund like the Environmental Water Account, a precedent for using markets to buy water for fish was established.

In December, 1991 an informal discussion process between urban, agricultural and environmental interests began. Many of the ideas that found their way into the final agreement were discussed, shared, and gained broad support during what was termed the Three Way Process. There were 60 members (20 from each side) and an 18 member steering committee. The goal was to create a management structure that would be attractive to all sides. Among the key ideas was an Environmental

Water Authority that would be created and funded to purchase and hold water rights for in-stream flows. The idea was to satisfy environmental needs and avoid involuntary transfers that were opposed by agriculture (Fullerton 1993). However, governments were not involved in this discussion and the ideas were not yet concrete.

Moving an idea out of its community of core supporters and into another is a difficult proposition that often proves insurmountable. One of the major barriers to any proposal affecting the Bay/Delta was that concessions accepted by one side were rejected by another. The Three Way Process provided a mechanism for networked support for the EWA. While the plans of the Three Way Process did not come to immediate fruition as a result of federal and gubernatorial intervention, the goal of a package of proposals that appealed to all interests survived. For the first time, all interests came to accept an EWA in some form. In the words of one participant, "We had the concept. What we needed was the political support and the grease of public funding to make it go (Fullerton interview 2003)."

Cast as Experimental

To begin, the EWA was set up as a limited experiment with yearly evaluations and a thorough review planned at the end of four years. The temporary status of the program may well have quieted critics who were convinced that the failure of the program would bring on its own demise. In fact, quite the opposite has happened. After nearly four years of operation, considerable political momentum has built around the notion of making the program permanent, and perhaps providing a permanent funding base through user fees to be paid by cities and farmers. A crisis sufficient to shut down the pumps has not occurred in three years, lending stature to the program and building confidence among stakeholders. Further, as cities as well as the state-operated EWA scour the agricultural fields for year-to-year water contracts, agriculturalists have come to depend upon revenues available from water leases to help them in times of high costs and low agricultural prices (Fulton and Shigley 2003).

Well Worked Through Policy Design

The most revolutionary aspect of the policy design is not so much the use of markets for ecosystem services, which are not new, but that fish management agencies should be given water to manage like every other user. Fish agencies are supposed to decide whether or not to spend their water assets on the basis of real time information about fish movements. This was a marked departure from previous practice, in which pumping levels were set automatically at a low level during certain months even though fish might not be present during those months but fish had no protection in other months except if endangerment triggered the draconian ESA requirements that curtail pumping operations. When endangered fish show up at the pumps at abnormal times, the release of environmental water is supposed to avoid any excessive take of endangered fish such as had occurred during the "Smeltdown". Fish managers now must be water brokers, deciding whether to expend assets to address present fisheries management problems with a particular species or to save water for future problems that may arise with other endangered fish. According to one participant, a paradigm shift has occurred among fish agency managers who are now interested in how much water costs (Fullerton interview 2003). Fish managers manage not just fish but also water assets and must consider risks to both simultaneously.

Careful analysis went into the determination of the size of the EWA and the source of its assets. Environmentalists were understandably concerned that the assets of the EWA would not be sufficient to protect fish, since a key part of the Bay-Delta agreement was that contractors in farms and cities could no longer be expected to bear any uncompensated costs to protect fish. A series of gaming exercises with the participation of important stakeholders was performed during the preparation of the Record of Decision on the EWA. The games, based on a 14-year hydrological sequence from 1980 to 1994, demonstrated to the satisfaction of some but not all stakeholders that the size of the EWA would be sufficient in all but a few years of extreme drought (Bay Institute). According to participants very familiar with the legislative process in natural resources decision-making, the EWA was subjected to an unusual amount of scrutiny and policy analysis. A wide group of decision-makers and stakeholders participated in repeated gaming exercises in which parameters were changed to simulate effects of the addition of different infrastructures and variations in fish behavior (Fullerton interview 2003; Snow interview 2003; White interview 2003).

A variety of options were provided for where and how the EWA could acquire fixed and variable assets. In addition, the EWA was to have a one-time asset of 200,000 acre-feet. It could purchase water from willing sellers, borrow water from stored or contracted supplies or acquire water by relaxing water

quality standards or using excess operational capacity. According to the plan, fish agency personnel meet regularly with project managers, the people who run infrastructure facilities, to determine when to store, move and release waters. The design envisioned that a good deal of learning would take place among operators who would come to understand fish needs and fish managers who would come to sympathize with operational constraints.

Outside Evaluation and Legitimizing

Another important aspect of the policy design was a mandatory review by a nationally recognized panel of scientists.ⁱⁱⁱ After the first year of operation, the lead scientist of the CALFED science program appointed a committee that has met each October, at the end of the season of greatest fish migration. Substantial problems were encountered during the first year when an unusually large number of salmon appeared at the pumps and substantially more than the 2 percent allowable take were killed. Rather than to use all the EWA to save the endangered Winter-Run Chinook Salmon in February and March, the fisheries managers opted to save some water for the Delta Smelt that might cluster near the pumps later in the year. The loss of a large number of fish, 90% above that allowable under ESA standards, made the newspaper headlines. At the same time, 1991 was the first in several years that the allowable take of Delta Smelt had not been exceeded. The Science Review Panel studied the record and took statements from stakeholders, water and fish managers and other experts. The panel report, though critical of a number of aspects of operations, especially research and the use of monitoring data, did not interpret the large loss of endangered fish as a failure. Instead they suggested that the method used by fisheries agencies to calculate the production of juvenile salmon had vastly underestimated the migrating population. The report suggested that if the estimate were correctly calculated, the take probably would not have exceeded the allowable limit. In all subsequent years, the juvenile production estimate has been calculated under the new methodology and mortality at the pumps has not been a problem. Had agencies simply switched to a new methodology without the blessing of the scientific committee, the fish agencies might well have been accused by environmentalists of lowering goals (California Bay-Delta Environmental Program 2001).

The requirement to prepare briefing materials and make presentations each year to the review committee has had a number of beneficial effects. Mid-level agency officials and scientists have learned to work much more collaboratively with one another. This has been particularly important in regard to the relationship between fisheries and water managers. Further, the review process has promoted learning from experience that allows policy to adjust to new science and changing circumstances. The science panel has urged with good results that the EWA managers develop expertise in water marketing. The public, formal review by the science panel is supplemented by periodic workshops on such things as fish predation, the operation of the gates at the Delta Cross Channel and salinity standards. Some members of the review panel and many stakeholders usually attend these workshops. The openness and transparency promoted by the review process has also served to pacify stakeholder groups. While the representatives of farmers' and environmental groups remain critical in different ways, the edge of the criticisms the first year has not carried over to subsequent years. Further, stakeholders' relations with one another have exhibited greater comity in recent years.

Skilled Implementation

To succeed in water markets special skills are necessary, involving knowledge about pricing, investment risks, and debt. These are not usually found in water or fisheries agencies. The EWA was blessed with skilled staff in its early years. David Fullerton, who was senior scientist at Natural Heritage Institute and was hired by CALFED to develop an analytical approach and computer model to make decisions about the types of water assets and quantities of water to acquire each year, was hired by the state and became the manager reporting to the Scientific Review Panel. Fullerton managed the successful acquisition of water during the first year. Overpayment is very difficult to determine, however, since prices vary widely in newly opened markets. When Fullerton moved on to the Metropolitan Water District, Jerry Johns, who had previously worked for the State Water Resources Control Board and was chief of the Bay-Delta unit, took over. Jerry Johns managed to diversify the kinds of water acquired by the EWA, always searching for the cheapest water whether it was located above or below the Delta. Johns engaged in long term financial planning that suggested that it was useful for the EWA to carry forward some water debt. The financial analysis suggested that the EWA would have problems paying off debt, oddly, only if there were a string of very wet years.

Jerry Johns prepared and disseminated information and procedures aimed at prospective water sellers to expedite acquisition of water with a minimum of third party impacts. The intention was to make the state an “enlightened consumer” of water through the EWA and other programs. The aim was to make purchases as environmentally and socially friendly as possible. Three principles guide the EWA: 1) no injury to other legal users of water; 2) no unreasonable effects to fish, wildlife or other in-stream beneficial uses of water; 3) no unreasonable effects on the overall economy or the environment in counties from which the water is transferred (California Department of Water Resources 2002). These rules address the usual complaints about rural to urban water transfers and their enunciation and enforcement avoids possible difficulties.

The Environmental Water Account also profited by exceptionally able leadership at CALFED and its science program. Lester Snow and his successor as head of the CALFED program, Patrick Wright, were highly adept at getting agencies to work together and to honor the adaptive management principles of transparency and stakeholder participation. Sam Luoma, on leave from the U. S. geological Survey, was the lead scientist during the first three years of CALFED operations. His impressive scientific credentials lent prestige to the program. The science program sponsored a large number of workshops and annual meetings, sometimes with hundreds in attendance. While it is not yet certain how much of the new science is finding its way into policy, a great deal more has been learned about fish behavior through CALFED science studies. Science is moving the management focus away from take at the pumps to the more general conditions existing in the total life cycle of fish. For example, it would seem that the pumps have less influence upon the survival of endangered salmon runs than was previously thought, at least if flows are above some threshold (White interview 2003). Also, predation studies in Clifton Forebay, which is the pool in front of the pumps, and studies of the consequences to fish of the operations of the Delta Cross-Channel may eventually result in means for saving endangered fish that may be as or more effective than the old method of reducing mortality by shutting down the pumps.

It may be too early to proclaim the implementation a complete success after only four years. To some extent the relatively peaceful period in water management may be partially due to luck. There have been neither critical extremes in temperature and rainfall nor critical changes in the political landscape. New challenges are on the horizon. While the EWA has survived changes in political party control in the statehouse and in Washington, new leadership always requires renewing of commitments to both CALFED and the EWA. Money is bound to be more of a problem in the future. Up until 2004, the EWA was funded mostly by bond money, with some small federal contributions of water and money in the early years. Since then, the federal government has not provided financial support and bond monies will become exhausted. The California state treasury is in terrible shape and it would seem a near certainty that some sort of user financing will need to be developed to make the EWA permanent and extend its operations into the future. While cities are generally willing to take on the burden, it is far less certain that agriculture will accept part of the costs of funding EWA. As the lessons of the past suggest, unless all three of the major interests, the environmentalists, cities, and agriculture, are in agreement, policy action becomes impossible.

Should EWA be authorized over a longer term, which at this point seems likely, there will be both additional opportunities and challenges. EWA will have additional flexibility to enter into long-term contracts that may bring lower water prices. However, it now will have to face the risks of inter-year expenditures of water. It may be too conservative in some years, resulting in unnecessary damage to fish, in order to save for a worse year in the future that may or may not come to pass (Scientific Review Panel 2003). In recent years, the EWA has had an opportunistic purchasing pattern that has cut costs, but has made EWA a strong competitor in the “cheap water markets” (Fullerton interview 2004). This has been controversial to the agricultural water buyers. If users are expected to pay for the costs of EWA, they may insist on the imposition of additional burdens on EWA management that may or may not be good for fish. It is a testament to its successful implementation thus far that the Environmental Water Account is facing a future, however fraught with peril. The EWA becomes more and more accepted and institutionalized with the passage of time.

Conclusions

Punctuated Equilibrium theory and organizational change literature are very helpful in explaining the conditions for policy change in the California Bay-Delta region. While it is difficult to predict in advance exactly when change will occur, and as Frank Baumgartner (this volume) makes clear in the introduction, the relative influence of change agents are context-dependent, it is possible to identify

certain causal variables. Evidence of obvious failure of the previous policy set the stage for the emergence of new policy images. Shifting to new venues also took place as action was shifted to arenas encompassing actors at different levels of government and involving all three principle water interests as well as the public. The political context of decision-making emphasized in punctuated equilibrium theory is also important here. The Environmental Water Account was swept along with other ideas in the package that became CALFED. No single item of this agreement could be removed without threatening the supporting coalition. Other theories related to organizational change also provide helpful insights including the role of professionals and innovation through organizational adoption of ideas in good currency among professionals, in this case "adaptive management." The following factors were identified as important both to this case study and sheds light onto other examples in the volume.

Positive feedback for change Evidence of obvious failure of the previous policy disrupted the feedback that had long reinforced path dependency in water resources. It was no longer possible to continue with business as usual. Each new problem identified—endangered fish, poor water quality, and interrupted water supply—was interpreted as cause for new policy innovation. Together, these perceived problems accumulated, creating a momentum that brought the policy change abruptly and decisively.

New Venue The movement of policy making from one agency, branch, or level of government to another is often identified as critical to large-scale policy change. In this case, the regional level became the venue where most significant change occurred. Although CALFED is a federal/state entity, and although participation of the federal level has not been formalized, the "Club Fed" or unified federal position led to state action and fostered federal/state collaboration. This highlights the importance of regional venues that are often overlooked in policy innovation. Often times the exclusive focus on the federal or state level of policymaking steers us away from complex environmental issues that are often best dealt with regionally. The case of the EWA gives reasons for optimism to those who see very little hope for positive change in favor of environmental quality at the national level. Innovation in this case took place at the sub-national regional level. It may be that at a time when environmental policy is at a standstill or going backward at the national level, regions and states offer much more favorable climates for positive change. Further, the case suggests that administrative agencies are quite capable of innovation when it is in their organizational interests.

New policy image or frame Thinking about an issue in a new way is often important to the mobilization of new constituencies focusing on policy change. These new policy images or frames are reflected in changes such as increased press coverage, the use of different metaphors and new causal theories. In the case of water, there were a number of competing frames that challenged the image of water as the product of an engineered production process. The case of the EWA indicates, however, that significant change can take place without a consensus on a new frame or image and without large-scale media coverage. Instead, policy elites came to agree upon an administrative concept, adaptive management, allowing different conceptions of water (as an economic commodity, or a place-based ecological resources) to coexist. Having co-existing frames that could be referenced by various groups kept all interested parties coming to the table with very distinct policy images. The master frame of adaptive management was able to encompass and override the importance of all other, potentially competing, frames.

Importance of Networks The role of entrepreneurs is generally identified as quite important to policy change. In the case of CALFED, leadership was clearly plural. The various change agents involved created an elite network that became much more important than any individual in its' support for change. While individuals in Secretary Babbitt's office in the Department of Interior were clearly important, leaders existed in each of the three principle constituency groups, agriculture, cities, and environmental groups. During the long gestation period in which policy change was bubbling up, people were talking across organizational dividing lines about trying something new. This network was critical in the creation of the resulting policy innovation.

Whereas often times policy change is seen as a function of social movements, in this case, the role of an elite network was clearly more critical. From the early 1990's and continuing for almost a decade there was continuous networked dialogue and negotiation took place among many different parties and levels of government. Ideas about adaptive management with learning through science and the use of flexible policy tools were spread among water experts in agencies, environmental groups, municipal water utilities and agricultural interests. This was not a case of building a new coalition that simply defeated the opposition. Instead, it was a sea change that occurred through the conversion of many into an adaptive management kind of thinking.

Adept Policy Design Successful policy needs to appeal across ideologies. Both this and the chapter written by Tom Dunne (this volume) suggest that purist approaches fail to reach across boundaries of ideas and interest to include the necessary mobilization required to push through new policies. Successful policies have wide appeal that seems to make most everyone a winner. This policy was a clear example of carefully packaging different benefits to different interests. The EWA promised security for both cities and farms in terms of water reliability while at the same time promising more water for endangered fish. The policy was designed to reflect the goals of the network members and no single item of this agreement could be removed without threatening the supporting coalition.

Cascades of Decisions and Momentum The political context of decision-makers who are responding to each other and amplifying the effects of small changes is emphasized in punctuated equilibrium theory. This is important here because the Environmental Water Account was swept along with other ideas in the package that became CALFED. No individual or group wanted to be responsible for derailing the process of change. Also, there was substantial political cover available for those who went along with the CALFED vision. Since other agencies were taking similar positions at the time, the risk of being wrong was substantially lowered in the event that problems occurred.

Gestation Period The particulars of this case also suggest that some amendments and adjustments to punctuated equilibrium theory are in order. There is the issue of change and the extent to which it is abrupt or continuous. This case would suggest that a great deal happens to promote change at a time when it appears that interests are deadlocked. While the adoption of EWA within CALFED was a sharp departure from the past, the concept had been discussed and broadly accepted within the discourse for years before it found its way into law. The process through which fisheries agencies came to believe that regulations were not providing the flexible, real time management tool they needed took as long as five years. Agency officials also had to be convinced not only that the EWA might provide a better management tool but also that they could not continue to wield the Endangered Species Act regulations as they had previously done. Cities and farmers were insisting on greater security, and fisheries agencies could not afford to hold out. The water issue was of such high visibility for so long that no one wanted the blame for derailing agreement (Snow interview 2001).

Role of Science While science is often used as a rationalization, and new science alone seldom is sufficient reason for change, science is very important to understanding change in this case. From the early 1990's and continuing for almost a decade there was continuous networked dialogue and negotiation took place among many different parties and levels of government. Ideas about adaptive management with learning through science and the use of flexible policy tools were spread among water experts in agencies, environmental groups, municipal water utilities and agricultural interests. This was not a case of building a new winning coalition. Instead, it was a process of conversion of many participants' mentalities to an adaptive management kind of thinking. Critical to change was the notion of best available science that could replace advocacy science where every interest group hired their own scientists to put their own spin upon data and conclusions. In fact, fish agencies were pressed to seek out new scientific ways to intervene on behalf of fish because of a limited EWA budget. Further, the hope for scientific advance displaces what otherwise might be deadlock between preservation and development.

There remains the issue of whether this significant change is enough. From the perspective adopted here, the EWA is a clear departure from the past because it changes the mind-set of fisheries managers so that they are conscious of the price of water and the limits of their account. Water managers learn as well as they come to understand the needs of fish as they work with fisheries managers to plan EWA water releases. Clearly, water management is more informed, efficient and environmentally friendly than before CALFED and EWA. However, for hard-core environmentalists who wish to see water scarcity set water limits to economic growth and human development, the EWA falls short. It assumes that with flexible and adaptive water management, water can be stretched to serve more purposes, including the survival and restoration of endangered species. From this more radical point of view, humans are already way out of balance with natural water supplies and spreading water to serve more purposes simply pushes humans closer to what is bound to be cataclysmic water system failure. The EWA is definitely development oriented to the extent that it places no identifiable limits to California's continued population and economic expansion. It does assure that endangered fish have a better chance of survival.

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Interviews

- Telephone interview with Lester Snow, former CALFED Director, December 16, 2003.
- Telephone interview, Jim White, Department of Fish and Game, December 18, 2003.
- Telephone interview, David Fullerton, Bay Institute, November 19, 2003
- Email interview with David Fullerton, March 22, 2004.

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ⁱⁱ The authors thank Steve Rayner and Denise Lach for this turn of phrase.

ⁱⁱⁱ In the spirit of full disclosure, it should be noted that Helen Ingram is a member of the review panel.